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BETTER FRUIT

VOLUME XV

APRIL, 1921

NUMBER 10

Brodie D. A.
Dept. of Agriculture
Comp



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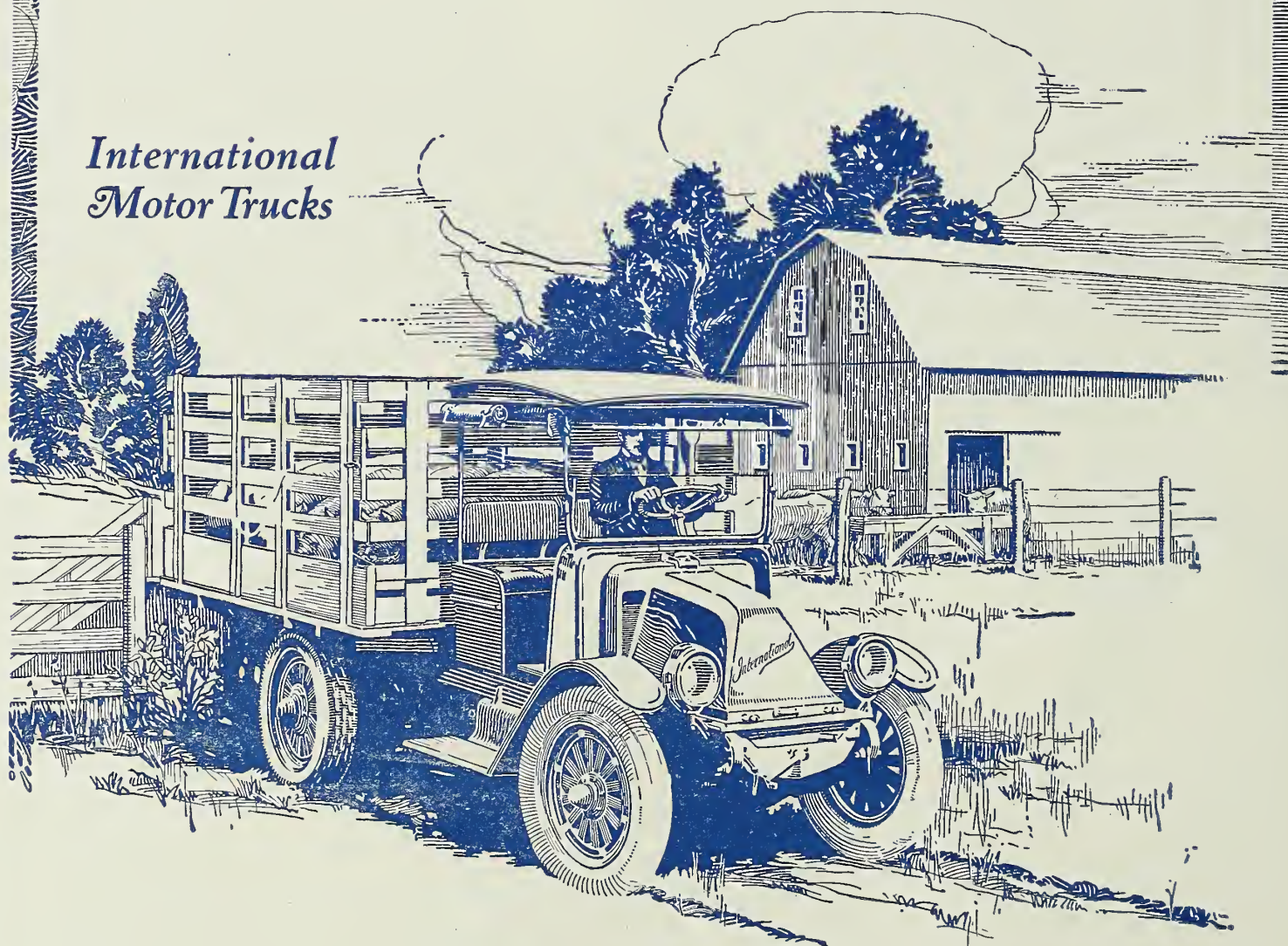
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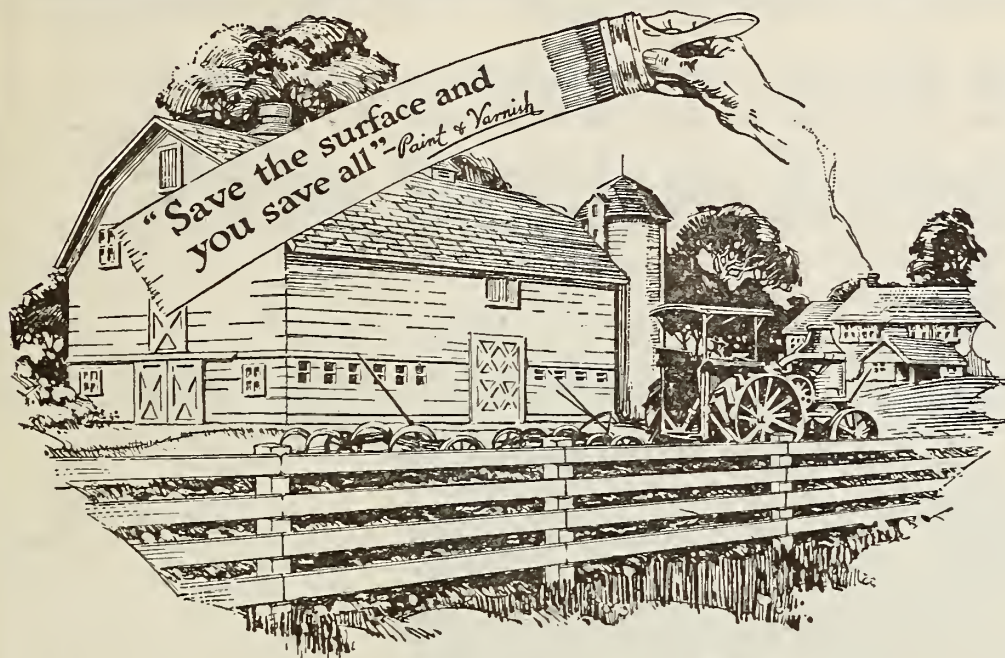
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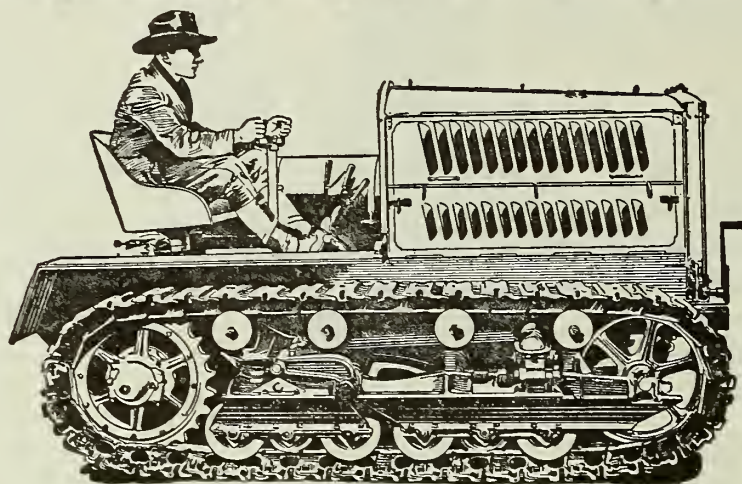
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BETTER FRUIT

An Illustrated Magazine Devoted to the Interests of Modern
Progressive Fruit Growing and Marketing

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VOLUME XV

PORTLAND, OREGON, APRIL, 1921

NUMBER 10

Controlling Brown Rot of Stone Fruits

By D. F. Fisher, Pathologist, Fruit Disease Investigations, U. S. Department of Agriculture

ONE of the most serious menaces to the crop of stone fruits in the humid sections of the Pacific Northwest is the disease called brown rot, and caused by a fungus technically known as *Sclerotinia Cinerea* (Bon.) Wor. Most orchardists are familiar with its attacks on the ripening fruit, but few appreciate its significance at other seasons, such as the rot of immature fruit, twig and limb cankers, and particularly as a "blossom blight," which prevents the setting of a crop. Fewer still understand important facts in the life history of the fungus which have a bearing on control methods. Since brown rot generally accompanies a period of rainy weather, the manifestation of the disease, both on blossoms and fruit, is frequently regarded as "just rot," or an unavoidable result of climatic conditions. Wet weather is essential to the growth and dissemination of the fungus and the spread of the disease, but is not otherwise concerned in the damage, except as it may hinder control methods, such as early spring cultivation or spraying.

LIFE HISTORY OF THE FUNGUS

SINCE most people are more familiar with its occurrence on the ripe fruit (fig. 1), this stage will be a convenient one from which to start an account of the life history of the fungus. There is never difficulty in finding plenty of fruit destroyed by brown rot during the ripening season of cherries, prunes, and other stone fruits in the humid sections west of the Cascades, and if there happens to be a rainy period at this time a large proportion of the crop may be destroyed. One rotten prune or cherry carries enough spores, or "seeds" of the fungus (a parasitic plant) which causes the disease, to infect the whole orchard or neighborhood. These spores are microscopic in size and are produced by myriads in the ashy gray tufts which cover the rotted fruits. The spores are wafted about by the wind or carried by insects, and if one is deposited upon a sound fruit and there be moisture present it will germinate the same as any

other seed. But the germ tube in this case penetrates the skin of the fruit and destroys or "rots" the tissues. Within a short time spore-tufts break the skin of this fruit and a new crop of "seeds" is ready for dissemination. If rainy

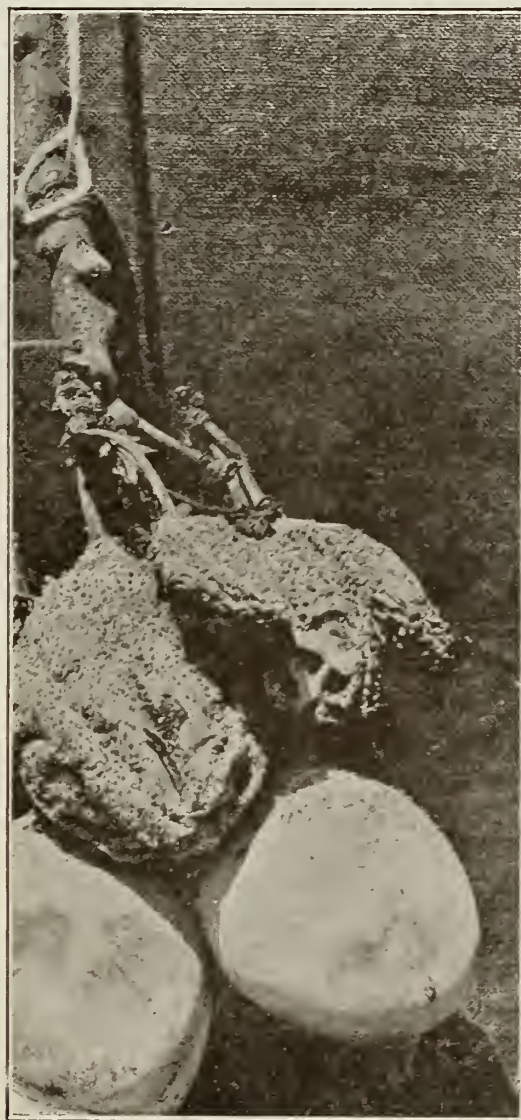


Fig. 1. Brown rot on maturing Italian prunes. The small tufts scattered over the rotted prunes are composed of millions of spores, each one of which is capable of infecting a sound fruit if it finds suitable lodgement on it. The disease also spreads by contact as shown in the illustration, having first started on the dried up prunes and spread progressively through the cluster.

weather continues the disease spreads like wild-fire, and fruit that is sound at night will show rotted spots in the morning. Brown rot is omnipresent in all orchards of this section and it is due to this fact that long distance shipment

of the ripe fruit is impracticable. It is never known whether fruit is infected or or not, or whether in the humid atmosphere of a refrigerator car it will "stand up" in transit. Fortunately the district is well supplied with canneries and dryers which furnish a profitable way to handle the crop, and fresh-fruit shipment is not essential. But even with the canned and dried fruit outlet serious difficulty is frequently met in saving the crop long enough to process in rainy seasons.

THE rotted fruits either cling to the tree over winter as "mummies" and shed more of the same kind of spores in the spring to infect the blossoms, or, as is more generally the case in the Pacific Northwest, at least, they fall to the ground where the fungus undergoes a certain change of development. Under these conditions it forms hard or stony "sclerotia" or resting bodies in the tissues of the rotted fruit. By this means it is carried over into another growing season. Whether it rests one or two years is a mooted point with different investigators, but evidence collected by the writer indicates that it may be either one or two years.

These "mummies" become covered with soil or refuse, or are kept moist by close contact with the soil, and about the time the buds are swelling in the spring they also resume activity. From the sclerotia in these mummies a stalk-like body appears, growing toward the surface of the ground. The length of the stalk varies with the depth the mummy is buried, the writer having collected some as long as five inches. Reaching the surface, there is unfolded from the top of the stalk a cup-shaped structure that soon flattens and sometimes becomes inverted like an umbrella. (See fig. 2). This is similar to an ordinary mushroom or "toad-stool" and is technically called an "apothecium." It carries myriads of spores of another type than those produced on the ripe fruit. They are contained in tiny sacs which are closely packed together on the inside of the cup—or outside of the um-

brella, as the case may be. When the proper stage of maturity is reached the containers are ruptured and the spores are expelled.

These "ascospores" are disseminated the same as the spores on the ripe fruit—by wind and insects, and, finding lodgement on a fruit or bud or blossom in the presence of moisture, will grow as in the other case described, thus producing a rot or "blight" of the blossom (fig. 3). Apothecia continue to appear until after the blossoming season, and so when weather conditions are favorable particularly a day or two of continuous wet or muggy weather at a time) serious damage is done to the prospective crop. There is hardly a season but what some loss occurs and actual observations of the writer have frequently shown as high as 90 per cent of cherry blossoms affected by brown rot. Orchardists have often attributed this damage to the rainy weather preventing pollination, to frosts, or to some other more generally understood reason.

WITH the rotting of the blossoms the growth of the fungus follows the same course as in the case of the rotting fruit and the spores produced are the same kind as on the ripe fruit. Ascospores are produced only from old mummies that winter over on the ground. The other type, or summer spores, as they may be called, are produced throughout the growing season and are visible over a considerable period. Blighted blossoms with their store of spores may be found attached to the trees as late as June or July. Thus a supply of spores is always at hand to infect the young green fruits if weather conditions are favorable, and the fungus is carried over until the time of harvest the second year, when the cycle begins over again. Usually the seasons when greatest damage occurs are at the time of blossoming and at harvest, but if an extended wet period occurs serious loss may be expected at any time.

Considerable work has been done by the Oregon Experiment Station relative to limb cankers and it is possible that they may be a source of infection in the spring, but in general these cankers are unimportant in the life economy of the fungus. Twig blight sometimes occurs when the fungus works back from infected blossoms or fruits. This has been observed especially on sugar prunes in the Northwest and on peaches in the East and South.

CONTROL METHODS

EXPERIMENTS on control methods were carried on by the department in Clarke county, Washington, and Marion county, Oregon, from 1915 to 1919, and the recommendations below are based on this work.

Effective control of the disease requires attention to cultural and spraying practices. Mummies should not be allowed to hang on the trees over winter and it would be beneficial if all the rotted fruit should be gathered and destroyed, but under large-scale operations this is impracticable. Resort should be had, therefore, to thorough tillage from the time the buds first show color

of application must be emphasized, for if a fruit or a portion of a fruit is not thoroughly covered there is a chance for infection to take place on this area. Finally, we must use an effective fungicide or spray material. Of these there are several that can be relied upon to control brown rot, but mention will be made of only three that may be regarded as standard.

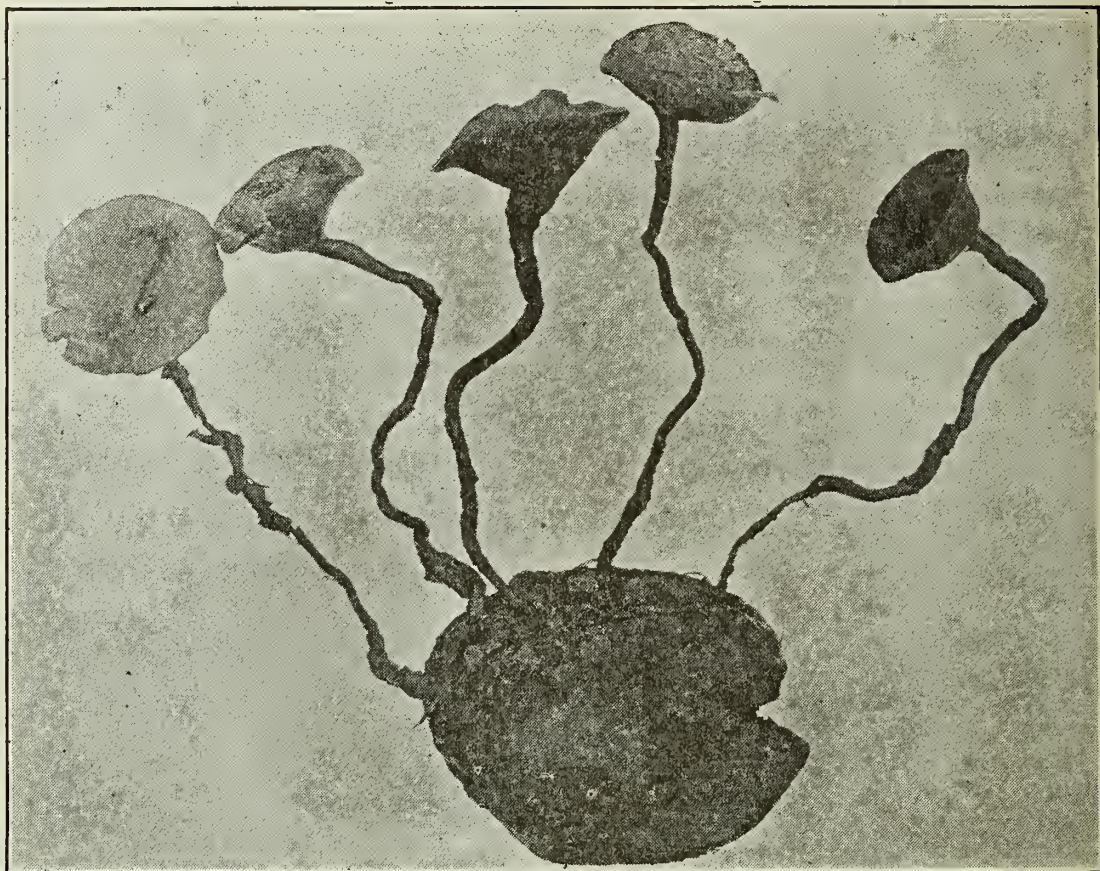


Fig. 2. Italian prune mummy with five apothecia attached. Apothecia appear during the blossoming season and shed myriads of spores which blight the blossoms and prevents them from setting fruit.

until after the blossoms fall. This will destroy large numbers of apothecia and reduce the chance of infection at this season. Heavy wet soils will seldom permit of this practice so early in the season, but where it can be followed it will be found of distinct value. Pruning the trees to admit air and sunlight will also be beneficial since drying will follow more quickly after rains and favorable conditions for spore germination will thereby be curtailed. But these cultural practices, while in themselves valuable, are only to be regarded as supplementary to spraying, which must be the main reliance of the orchardist in combatting brown rot.

In spraying for this, as for other fungus diseases, the point to keep in mind is that this treatment is preventative and not curative in nature. That is, by applying a fungicide we cover susceptible parts with a material that prevents the spore from germinating or destroys the parasite before it can invade the host. Once infection has taken place, meaning that the tissues of the fruit or blossom have been invaded by the fungus it is too late to destroy it by sprays. Hence timeliness of spraying is a prime essential. Next, thoroughness

BORDEAUX Mixture, 4-4-50, is the old stand-by, and for effectiveness can hardly be improved upon, but it is not safe to use on peaches and some tender plums. For cherries and Italian prunes it is quite satisfactory, although frequently causing more or less severe foliage burning early in the season or during wet weather. It is also more expensive than the other materials mentioned below.

Commercial lime-sulphur is safe to use on cherries and prunes at a dilution of 1 to 50, but must not be used on peaches or Japanese plums at any dilution. Applied during late summer, when hot weather prevails there is sometimes severe foliage injury. It is, however, an effective control agent for brown rot.

Self-boiled lime-sulphur, 8-8-50 (8 lbs. lime, 8 lbs. sulphur, 50 gal. water), is possible the safest and best all around fungicide for use on stone fruits, and may be used on peaches without danger if properly prepared. It is best made in lots sufficient for 200 gallons of spray. Place 32 lbs. of good fresh stone lime in a 50-gallon barrel and start slaking by adding sufficient water for that purpose. When the action is well

(Continued on page 15)

Western Apple Industry Problems

By Dwight L. Woodruff, District and Export Manager Hood River Apple Growers' Association at New York

THE apple season of 1920-1921 is now about ended. The curtain will soon be rung down on the final act and many in the audience will turn away not wholly satisfied.

Every industry has its trials and victories, smooth sailing never develops strong, brave and capable sailors.

No business has escaped the experience of post war readjustment. All lines of industry are slowly but surely settling down to a basis of safety and adjustment to new conditions brought about by the awakening from the experience of exorbitant prices, big profits, easy money, unnatural demand and lax financial methods.

Perhaps no class of producer has suffered more severely during the business depression of the past eight months than has the American farmer, but among these probably the Northwestern fruit grower has been as little injured as any. We are all disposed to believe our lot the most burdensome and difficult. It is easy to see the fine points of the "other fellow's" particular line of business while bemoaning our own situation.

Statistics seem like dry reading, but reference to the table below will be both helpful and cheering.

Wholesale decline in prices between February 1, 1920, and February 1, 1921, as published by the Irving National Bank, New York City:

Breadstuffs	32.3
Livestock	38.1
Provisions	23.3
Fruits	16.0
Hides and Leather.....	41.1
Textiles	57.1
Metals	35.9
*Coal and coke.....	23.0
Oils	40.4
Naval stores	50.7
Building material	9.2
Chemicals and Drugs.....	6.0
Miscellaneous	60.8
*Increase.	

Thirteen commodities, including the miscellaneous list, show an average decline of 42.3 per cent, while fruits only show 16 per cent. Coal and coke show advances and only two items less decline than fruits.

A comparative reference to gross sales at the big consuming centers show only slight declines on standard varieties and sizes of apples, but the net returns are very much less on account of greatly increased freight charges, storage rates and other advances.

Sober thought compels us to admit we have much to be grateful for. However, we should not lose sight of the fundamental fact that no business can stand

still. We must either advance or recede, for we are surely now facing unusual conditions which must be met and mastered if we would maintain our rightful place.

The most outstanding problems we have to deal with, as I see them, are:

First—Transportation charges.

Second—Size and quality of our fruit.

Last—Wide difference between wholesale and retail prices.

The three problems are closely inter-related. Transportation rates may decline and then again, they may not. If they do decline, the grower directly benefits, but his difficulties are not thereby altogether overcome, as many would have us believe. Should the rates remain unchanged, we must rapidly alter our export methods and use the all water routes to the United Kingdom and Continental Europe for pears and apples.

The question of size and quality of our Western apples is a most serious one. Fifteen years ago with our young trees bearing large clean fruit, our output decidedly limited in quantity, we had no task to readily dispose of our crops at satisfactory prices and, in fact, the buying competition was exceedingly keen. Dealers in New York, Chicago, Philadelphia and other large cities were eager for all the fruit we could produce.

As our crops increased, the growers in New York state, New England, Virginia and, in fact, all apple producing states saw what the Northwest was doing and quickly bestirred themselves to meet this new competition by systematic spraying, pruning, cultivation, fertilization, improved grading and packing methods and while this was going on, the West had suffered some serious disappointments—low prices, the result of outgrown selling methods.

This was the direct cause of many growers neglecting their orchards until as a whole the Northwest produces far too many second and third grade small sized apples that come in direct competition with apples grown much nearer the large consuming centers which can profitably be sold at the price Western growers pay for freight.

The freight on a box of jumble pack Ben Davis is the same as on a box of 3½ tier extra fancy Spitzenburgs or Delicious, but the value in New York is as one dollar is to five dollars. The one shows a dead loss; the other a substantial profit—which will you grow?

Let us forget the two or three abnormal years just passed and get our feet back on earth again. Stop deceiving ourselves into believing that the only

(Continued on page 16)

Red Gravenstein Apples

See front cover of this copy of Better Fruit for full sized colored illustration of the Red Gravenstein apple which possesses all the good qualities of the old Gravenstein in flavor, size, shape and ripening period, to which is added a bright red color, greatly increasing its attractiveness and market value. The Red Gravenstein has established a record for quality and productiveness which makes it a leader.

Our stock of Red Gravenstein trees is entirely sold out, but we will again offer trees of this splendid variety for fall, 1921, and spring 1922, delivery. Place your order now and be sure of getting your Red Gravenstein trees next season.

Meanwhile:

For commercial planting we still offer in limited quantities the following fruits in proven varieties:

APPLES	PLUMS
PEARS	CHERRIES
PRUNES	And other
PEACHES	Fruits

Also a big line of small fruits, choice shrubbery, shade trees and roses.

Whether a few trees for a home orchard or thousands of trees for a commercial orchard, you want the best. Good trees soon pay their own cost.

Eighteen years in business at this same location and thousands of satisfied customers throughout the West are evidence of good trees and good service.

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Feeding directions for chicks tells not only just what to feed, but exactly how much—right to the ounce—no guess. No gapes, toe-picking, leg-weakness, diarrhea, etc., in our chicks.

My book also contains my feed formulas and methods that save me 25c to 50c a hen a year, and produced fourteen 300-egg hens out of the 450 pullets. How I fed a test pen of 90 pullets one grain feed a day and got four 300-egg hens. How I selected the pullets from the general flock to be trapped that made so many high producers.

Other items are: Self-feeding hoppers that are absolutely wasteproof. Artificial lighting. Self-cleaning chicken crates. Self-cleaning nests. Sanitary dropping board with miteless roosts. No. 1 Mite Paint at 10c to 25c a gallon. Wet mash mixer for 500 to 1000 hens for \$1, etc.

HART'S POULTRY BOOK \$1.00

Remember this—your money back if not satisfied with the book. Over 700 sold last spring. You can't lose.

**W. H. HART, R. 3, Box G,
BEAVERTON, OREGON**

Keeping the World Warm Overnight

THE weather bureau of the United States Department of Agriculture has been able to discover the weapon used by that old enemy of mankind, Jack Frost, and in a recent published report it tells the farmer and fruit grower just what Jack's invisible weapon is, and how, under ordinary conditions, the sprite's own artillery can be used against him.

Frost, of course, occurs whenever the mercury drops to 32 degrees Fahrenheit or lower. If much moisture is present in the atmosphere this drop in temperature is manifested by the white

crystals of frozen moisture upon leaf or grass stem, and there is what is known as "white frost." If the temperature drops to the required degree and does not reach the point when water from the air is condensed, there will be few crystals deposited, and the result is a "black frost." A "freeze" is the term applied to a condition of cold more permanent than frost, and such a condition may occur when there are high winds. True "frosts" occur only when the surface air is relatively calm.

Temperature, like water, seeks a level. During the day the earth receives more heat than it can throw off, but at night, this supply of heat is stopped. During the day the heat thrown off by the earth warms the thin blanket of air next the ground. This blanket, as it warms, loses its density and ascends. Cooling as it rises, presently it encounters air of its own temperature, and there it stops. Meanwhile its place has been taken by other colder air, which is in turn warmed by contact with the ground. This exchange goes on until, at sundown, all the air of a wide layer above the earth has been warmed, and the highest temperature is felt nearest the earth.

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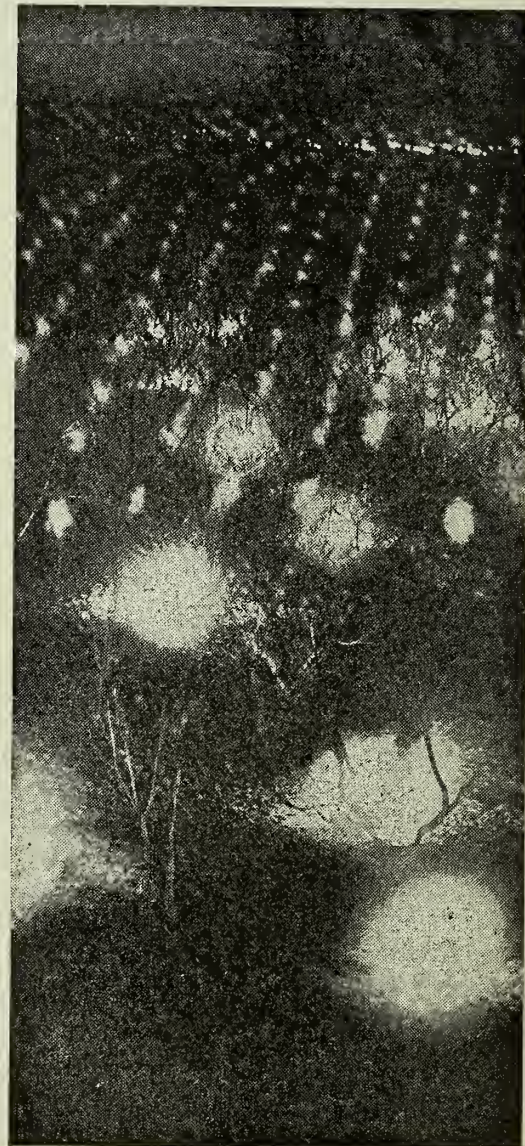
"Black Leaf 40" may be combined with Lime-Sulphur, Bordeaux, Lead-Arsenate, soap and other spray materials, thereby saving the expense of a separate application.

For further information as to
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Orchard Heating Scene in the Grand Junction
Valley, Colorado

IN FROST susceptible districts progressive fruit growers have learned that the best way to protect their orchards is by kindling numerous small fires or by the use of heaters.

This method of preventing frost is very efficient, and each year it saves much money for American fruit growers. Just how it has been applied, how many fires are needed to the acre, and the form and style of burner giving the best results, are well discussed in the Weather Bureau Bulletin No. 1096.

Many a fruit grower has nursed an expensive orchard to the point of bearing only to see his well-deserved reward vanish in a single night. But more and more we are discovering that, if we can not defy certain natural laws, we may still nullify their results through a better understanding of their principals. This is what the up-to-date fruit grower does. He cannot eliminate frost but he can use its principles to protect himself from its effect.

THE weather bureau bulletin treats the frost prevention methods very thoroughly, and the pamphlet should be particularly useful to anyone who owns an orchard or who contemplates planting one. First of all, the experts point out, the orchard owner should determine whether his crop will pay the expense of protection if it will not, then he had better move to a less erratic climate. Certain fruits will stand a lower temperature than others and the experts furnish a temperature chart to show this.

Here it is:

TEMPERATURES ENDURED BY BLOSSOMS
FOR 30 MINUTES OR LESS

Fruit	Closed but Showing Color	Full Bloom	After Fruit Has Set
	Degrees	Degrees	Degrees
Apples	25	28	29
Peaches	25	26	28
Cherries	25	28	30
Pears	25	28	30
Plums	25	28	30
Apricots	25	27	30
Prunes	28	29	30
Almonds	26	27	30
Grapes	30	31	31

Charts which show in a graphic way how the fires should be distributed through an orchard are reproduced. These have been prepared from studies made in successful orchards and are the result of the best method in use in this country. Overhead costs are discussed, as well as the care of the frost-fighting apparatus.

Precautions against pear blister mite should be taken at once. The use of lime-sulphur put on at a strength of 1 to 8 or miscible oil, 1 to 17, just as the buds are swelling will give control of this pest.



Out!

and ready
for the pile in no time!

Just one hole bored at the proper angle
and loaded with a few sticks of



STUMPING POWDERS
Du Pont and Repauno Brands
(Pacific Northwest Products)

firmly tamped in with three feet of fuse attached, the flare of a match—and this great stump was torn from its resting place and ready to be laid on the pile.

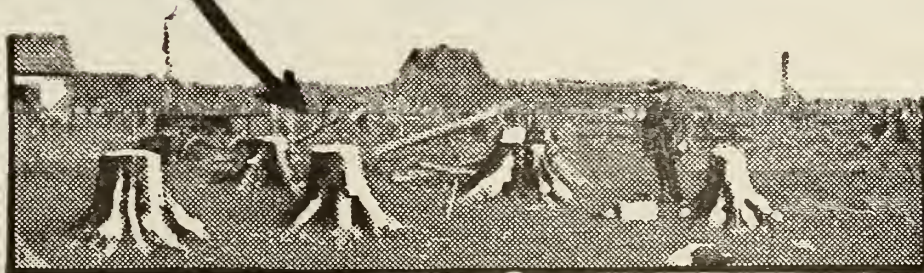
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610 Spalding Building, Portland, Oregon

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The Peach and Prune Twig Borer

By Claude Wakeland, Entomologist, University of Idaho

THE peach and prune twig borer which annually causes severe injury to peaches, prunes and apricots can be easily controlled with lime-sul-

phur solution when applied to the trees just before the blossoms open. The borer passes the winter as a tiny brown worm in the crotches of the trees

and emerges to begin boring into the tips of the trees about the time the blossoms have opened.

Like most of the injurious insects in the United States, the twig-borer is not a native but was introduced into this country from Western Asia. It has been known in the United States since 1860 and now has a wide distribution. While it feeds more generally on the peach than on others of the stone fruits, it attacks also apricots and plums and is of particular importance in Idaho because of the loss it causes prune growers.

CAUSE OF INJURY

INJURY is caused by the larvae or worms of the borer. These hibernate in small, silk-lined cells just beneath the surface of the bark in the crotches of branches and twigs. In the fall they may be easily located by the presence of little mounds of borings over the entrances of their burrows. After larvae have ceased activity in the fall and the borings are destroyed or rubbed off, they are difficult to discover and the orchardist who would find them is likely usually to have considerable digging around in the crotches if he observes them.

At about the time peach buds begin to show pink in the spring the overwintering larvae become active, work themselves out of their silk-lined cells and make their way to the twigs where,

"—and it's a real box too"

boasts the boss packer

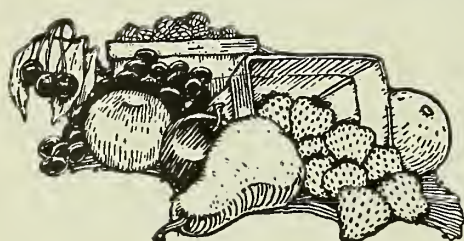


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The fertilizer for fruit should be well balanced, and contain from 7 to 10 per cent. of Potash.

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in the course of a day or so, they eat into the tips until they are concealed and protected. Here they eat not only the tender tips but also burrow into the pith of the small twigs, causing the leaves to wilt and die. In the spring when wilted twigs may be easily noticed, the work of the twig-borer is more evident than at any other time of the year. A single larvae may go from one twig to another and the injury caused by only a few of them may be great.

NUMBER OF BROODS ANNUALLY

THERE are probably not more than two broods annually in Idaho and in the higher altitudes but a partial second brood. As already mentioned, the first brood attacks the foliage, but larvae of the second brood bore into the fruit, usually through the stem end, and feed freely on the fruit or inside the pit. The appearance of wormy peaches and prunes is too familiar to most orchardists to need description and a very large proportion of the gummy peaches and prunes which are a source of no small annoyance to packers and loss to growers are the result of injury caused by larvae of the twig-borer. Losses of as great as twenty-five per cent have been reported, but it is a significant fact that little or no loss occurs in orchards which are regularly sprayed with the dormant spray of lime sulphur.

APPEARANCE OF THE TWIG-BORER

WHEN fully grown, the larva is about three-eighths of an inch long, of whitish yellow or pink color and sparsely covered with fine, bristle-like hairs. The fore part of the body and the head are brown or almost black.

After the larva has become fully grown, it changes to the pupa, in which stage it remains for two or three weeks. The pupa is enclosed by a few threads of fine silk. The first brood passes the pupal stage in cracks or rough places in the bark, between fruits which touch each other and among trash and vegetation on the ground. The later brood is believed to pupate mostly in the depressions at the stem-ends of the fruits.

The adult of the peach and prune twig-borer is a small, gray moth about one-fourth inch in length and one-half inch from tip to tip of outstretched wings. Both front and hind wings have a fringed border. Moths are not easily observed and are rarely recognized by orchardists. Eggs of the first brood of moths are laid on leaf stems but those of the second brood are laid in the stem-end depressions of fruits and in crevices of bark between crotches. When first laid they are nearly white but before hatching change to yellow.

TOP-DRESSING TALK No. 5

Fertilizing for the Cover Crop

An early application of *Arcadian Sulphate of Ammonia* to the orchard will stimulate fruit bud formation, increase the amount of fruit set and enable the tree to carry a full crop of fruit to maturity.

In addition, the nitrogen and the sulphur will greatly increase the growth of the cover crop, which if plowed under, will build up the organic matter content of the soil.



The picture above shows the beneficial effect of this fertilizer on a cover crop of sweet clover.

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Arcadian is the kiln-dried and screened grade, made fine and dry for top-dressing purposes. Ammonia 25 $\frac{1}{4}$ % guaranteed. Made in U. S. A.

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Agricultural Department

510 First National Bank Building, Berkeley, California

CONTROL METHOD

LIME-SULPHUR applied thoroughly to twig-borer infested trees just before the buds begin to open in the spring, is known to be an effective means of controlling this pest. At this time over-wintering larvae become active in their cells and are readily reached by the contact spray. The later the application is made before the buds open, the better will be the results obtained. By delaying the application of lime-sulphur until the time mentioned a single treatment will be effective in controlling both San Jose scale and the twig-borer.

Success is sure but it must be emphasized that it depends on the proper timing of application, correct strength of material and extreme care and thoroughness in the work done. One must use standard lime-sulphur solution of 32 degree or 33 degree Baume test. The proper dilution is at the rate of one gallon of lime-sulphur to eight gallons of water. It is important that every bit of twig, branch and trunk surface be covered.

The addition of arsenate of lead to the lime-sulphur solution has sometimes been recommended for the control of the peach and prune twig-borer but experiments and observations made in Idaho and other Northwestern states

show that this combination is unnecessary and creates needless expense. Attempts to control the pest with arsenate of lead sprays alone are likely to prove unsatisfactory. There are cases where such a spray has gotten results desired but repetitions of the same method may end in failure. This is probably due to the fact that borers emerge so irregularly in the spring that it is impossible to apply one poison spray which will be effective against all larvae coming out of their winter quarters.

Caring for the Tractor

TAKING a tractor into the field that has stood idle all winter without any care or inspection is to invite trouble. In calling attention to this phase of the use of a tractor, Tractor Farming has this to say:

"Keeping a tractor in first-class working order is not a difficult matter for the average man if he knows how to do it, provided of course, that he has a machine which is designed with easy accessibility in mind.

"It is not at all difficult to tighten the connecting rod or main bearings on a properly designed tractor, and a man of ordinary intelligence can do the job with a little instruction. Neither is it a difficult job to remove the carbon

from the combustion chambers, to grind the valves, remove the spark plugs, replace worn rings, adjust the magneto, breaker points, and numerous other little jobs which require but a few minutes for an experienced man, but which play a very important part in keeping a tractor on the job without delays.

"Time lost on account of trouble with any farm machine is usually a serious matter, as it nearly always interferes with the planting or harvesting of the crop and costs money. In the case of the tractor, which is used for more operations and more days per year than most other machines, it is even more important than with the rest of the equipment.

"With the large number of tractor schools which have been held during the past year and held by many state colleges, there is no excuse for any tractor owner not being capable of overhauling his own tractor. The instructions given in these schools is not only of value to the operator while the machine is in the field but it also qualifies the owner or operator to go over the tractor at odd times in order to put everything in shape."

Notwithstanding the advance in the price of nursery stock it is still profitable to plant well selected varieties of many of the tree fruits.

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Write the Marine Products Co., Tacoma, for literature and testimonials.

Bits About Fruitmen and Fruit Growing

THE APPLE industry of the Pacific Northwest is in better shape relatively than any other agricultural industry, is the statement of J. S. Crutchfield of Pittsburg, Pa., president of the American Fruit Growers, Inc., a \$100,000,000 concern, which has large orchard holdings on the coast as well as in other sections of the United States. Mr. Crutchfield expressed this opinion at the annual meeting of the Spokane Fruit Growers' Company on a recent visit to the coast, and added that in the next five years he expected to see this industry attain greater prosperity than has been the case in the past five years. In discussing the apple industry in this region further Mr. Crutchfield said:

"The Pacific Northwest apple is an international apple. Its market is the world. South Africa, South America, Central America, Australia and Northern Europe are its natural market. Because it is an international fruit which will stand up under severe strains, such as cold storage to which it must be subjected. As it is and must be an international fruit and its market is the world it cannot be a small apple, such as is grown in the East. I believe that the big red apple which made the Northwest famous must be grown in the future if this section continues to hold its place in this world market and expand its output still further."

▲ ▲ ▲

AS the result of experiments conducted by D. F. Fisher, pathologist with the United States Department of Agriculture, located at Wenatchee, Wash., it is believed that he has discovered a method of keeping apples from two to three months longer than when packed in the ordinary way. The discovery consists in wrapping the apples in a specially prepared oil paper, which absorbs the destructive gases. The tests made with the different varieties of apples show that the oiled wrappers are particularly effective against scald, one of the storage diseases of apples that causes the greatest loss in the Pacific Northwest.

The test which was considered the most successful in showing the results of the new method was made during the past winter with apples of the Grimes Golden variety. The specimens were picked September 20 and put into storage two days later. They consisted of fruit wrapped in the oiled paper and in the ordinary apple wrappers. When taken out of storage a short time ago, the apples wrapped in the oiled paper were found free of scald and in fine condition, while the others were in a bad state of decay. The Grimes Golden, the variety selected for the test, is not a late keeper and the fact that those wrapped in the oiled paper were found in good condition two months after their usual keeping season has convinced many shippers and growers who have witnessed the result of the experiment that a very important discovery has been made. The cost of the oiled paper is not excessive and it will be used by many growers during the coming apple shipping season.

▲ ▲ ▲

ABOUT 2,250,000 cases of Australian apples will be available for export during the coming apple shipping season, according to estimates published by the Canadian department of trade and commerce. It is doubtful, however, states the report, whether shipping facilities can be obtained for the movement of anything like this quantity. In fact, exporters do not anticipate that more than 1,250,000 cases can be shipped overseas owing to the lack of cold storage facilities on steamships now engaged in the Australian trade. The early varieties of Australian apples come on the market during the last week in February and the late varieties are picked toward the end of April.

▲ ▲ ▲

SAMUEL ADAMS, editor of the American Fruit-grower made a visit to the Northwest fruit-growing sections during the past month. Mr. Adams, whose home is in Chicago, made the trip to the coast for the purpose of getting first-hand knowledge of fruitgrowing methods and conditions in the box apple region, and also to interest fruit-growers on the coast in the national conference recently held in Chicago.

▲ ▲ ▲

RECENT advices in regard to the coming canning season are to the effect that a much lighter factory pack of canned goods will be put up this year than last. The reason assigned for the reduced pack this year is the heavy carry-over from last season. Prices for canning stock on this account are expected to rule considerably lower.

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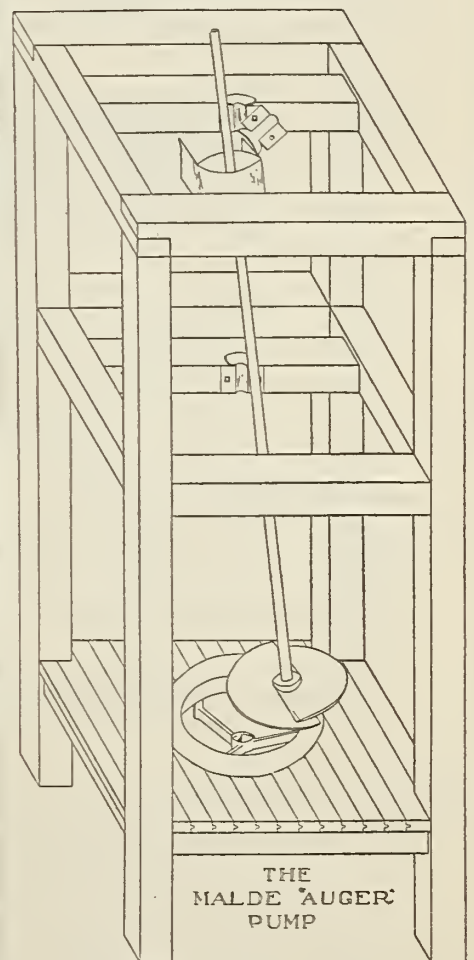
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Unique and one other	ALL PREPAID	\$9.10

Evergreen Plantation

NEW MEADOWS, IDAHO

Knowing Spray Quantities Important

By Leroy Childs, Superintendent Hood River Experiment Station

IN CONNECTION with the investigational work on sprays and spray practices carried on at Hood River some interesting figures have been gathered relative to the amount of diluted spray required to obtain effective control of the various orchard pests present.

On all the problems of spraying which come to the attention of the orchardist, the actual requirements of trees of different ages for different spray mixtures are least known and perhaps least seriously considered. To this lack of understanding can often be traced the failure to check the ravages of the many familiar insects and diseases. Thorough spraying is to be desired, but over spraying is a waste of expensive materials and time. Incomplete spraying, on the other hand, is a double disaster, a waste of materials and time, and a failure to control the pests. Every orchardist should more closely check up his average tree usage for every spray applied during the season. There is no more clear-cut method of telling just what has been done in the orchard, from the standpoint of spraying than an analysis of this sort. With sprays of a similar nature in an orchard of more or less uniform trees, a very high degree of uniformity in the number of trees covered should be maintained with each tank of spray applied. If this is not maintained, there is something decidedly wrong in the technique of the application. During years of light crops growers who "spray for fruit" in their codling-moth control are frequently at a loss to account for the many wormy apples present in picking time. A study of the average quantity of spray used per tree in an orchard thus sprayed as compared to a well-sprayed orchard usually proves a revelation of startling inadequacy. Spraying for fruit in the case of both apple-scab and codling-moth or for the control of other insects or diseases, for that matter is not an advisable practice. In the early applications it is almost impossible to determine accurately whether a tree has fruit on it or not. If the missed or partly sprayed tree turns out to have a box or even a portion of a box of fruit on it, a large portion of the fruit will be wormy. Not only is this fruit lost, but the very fact that a good number of worms have been propagated and have spread to surrounding well-sprayed trees results in a general increase in the percentage of wormy apples and a very

decided increase in the percentage of "stings."

During the summer applications, that is, after the trees have developed a large proportion of their foliage, the spray requirements for each application are about the same. In orchards where careful records of spray usage have been obtained we have found that associated with regular amounts of spray used is a very decided irregularity in insect and disease control. In numerous instances it has been observed that these irregularities—failure to use sufficient amounts of material (gallons per tree) in some of the sprays—has caused a loss through the increase in damaged fruit that would have more than paid the total spraying charges for the entire year.

AVERAGE SPRAY REQUIREMENTS FOR BEST CONTROL ON TREES OF DIFFERENT AGES*

Age of Trees	Miscible Oil Gallons per Tree	Summer Applications for Scab and Codling-moth	Fall Bordeaux
11	4.1	4.1	..
12	4.5	4.5	5.0
13	5.6	4.5	5.1
14	7.0	5.2	..
15	7.2	5.6	6.1
17	8.0	6.0	7.4

*Based upon information obtained in a number of successfully sprayed orchards during the years 1912, 1918 and 1919.

THE tree requirements for the different sprays used in combating our various troubles are quite varied. It has been found that in order to obtain a complete covering with the miscible oil spray used largely for the control of the leaf-roller in the Hood River Valley—and applied as a delayed dormant spray, much more spray must be used than is needed for the late spring and summer applications of arsenate of lead and lime sulphur for the control of codling-moth and apple-scab. The reason for this greater requirement is due undoubtedly to the fact that the twigs and branches must all be thoroughly covered if the desired results to be obtained. In so doing the tree must be very carefully worked over and in view of the fact that, contrary to the usual belief, oil does not spread easily, a good deal of spray is lost in obtaining a complete covering. In the case of seventeen-year-old trees studied, about two gallons more per tree is used with the oil spray than with the summer applications. The proportions were about the same in trees of other ages. Next in point of requirements comes the full bordeaux mixture used for the control of anthracnose. Here again the essential factor involved is the



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Mr. John T. Bartlett, in March 16 *Outlook*, says:
 "The bushel basket furnishes many economies. Shipped to the farmer nested, carried thus to the farm and even to the orchard, the basket furnishes a saving in transportation cost without the subsequent necessity of putting together the packages."

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The Chas. H. Lilly Co.

Yakima SEATTLE Portland
 Ellensburg Wapato



thorough covering of all of the twigs, branches and trunks, a procedure requiring more time and materials than is found necessary for the coating of foliage and fruit in the summer sprays. It has been noted that about a gallon and a half more spray is required in the autumn on old, bearing trees to cover them completely than is required on the same trees during the summer. The table shows the average amount of spray per tree applied in well sprayed

orchards of different ages in the Hood River Valley where very satisfactory results have been obtained.

As the summer approaches look out for sun scald on trees that have not sufficient foliage to shade their own trunk and main limbs. A little care will enable you to shade the threatened parts in some manner and thus avoid having damaged bark on the southwest side of the tree.

BETTER FRUIT

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Absorbing the Profits

As the season draws to a close for handling and distributing the 1920 fruit crop it becomes more and more apparent that the small margin of profit and in many instances losses that have been sustained by the fruitgrowers of the Northwest is largely due to the big advance in freight rates. This has been particularly the case with the box apple industry, the freight rate advance taking the difference between a loss and a profit to the growers.

Inasmuch as this industry is one of the most profitable in the way of revenue that the railroads handle from the Northwest and that its continuance will be jeopardized by the maintenance of these high rates, the railroads should take action to reduce them. They have already announced a reduction of the rates on lumber from the Northwest. Why not on fruit? With the rail lines absorbing all the profits of the growers it is not difficult to see what will happen to the fruit growing industry of the Pacific Northwest.

It is hoped that before another season for the heavy shipping of fruit rolls around that these prohibitive rates will be reduced. Let the railroads make the announcement of a reduction in the near future, thereby stimulating and reviving an industry that is second to none in making for prosperity on the Pacific Coast.

Farm Homes

In a statement recently made by Miss Abby L. Marlatt, director of home economics at the University of Wisconsin, she sounded an important note by saying that "farm homemaking is no less fundamental to the welfare of the nation than is farming." In taking up the subject of farm homemaking Miss Marlatt's idea is that the farm home should contain as many of the conveniences and comforts as possible in order that it will prove attractive to the younger members of the family in addition to lightening the burdens of farm women.

To illustrate the lack of modern equipment and the difficulties under which farm women work, Miss Marlatt shows that a survey of 10,000 farm homes disclosed the fact that the average working day of the farm housewife averaged 11.3 hours a day with practically no vacation. Kerosene lamps were found in three-fourths of the homes studied, while only one-third of them had running water and a still smaller number provided with hot water systems and other conveniences.

While the absence of these conveniences is not so great in a number of the orchard districts of the Northwest, still there is room for a great deal of improvement along this line, particularly in the way of water and light systems, which in many instances could be provided at a nominal cost. In these days when the young people in the agricultural districts are flocking to the cities it is just as important to keep the boy or girl on the fruit ranch as it is on the farm. One of the most effective ways to do it is to make their home life as attractive as possible, as well as to give the women of the household at least a partial release from drudgery, by the use of labor saving equipment. To raise the standard of the farm home farm women must have a certain amount of leisure.

National Coöperation

With the organization of coöperative fruit selling associations in many sections of the country the proposal to form a national organization, which has been undertaken by the American Farm Bureau Federation, follows out the ac-

tion that has been taken in regard to assisting the producers of many of the other soils crops in getting a better and more economical system of distributing and marketing their products. Organized along the right lines and with men of experience and intelligence in the fruit industry and in marketing at the head of it such an organization should prove of vast assistance to the local coöperative associations.

It will be necessary, however, for a more widespread organization of local coöperative fruit handling bodies than has yet been the case in order to insure success. While the Pacific Northwest has made long strides in this direction it needs the support of the Eastern fruitgrowing districts. Of late these Eastern districts seem to have become aroused in regard to coöperation and indications are that they will join in the movement to secure the organization of a nation-wide body that it is hoped will go a long way in its operations to solve many of the marketing and other problems that are now working to the disadvantage of the fruitgrower.

Spraying

The spraying season has commenced, although growers have been hampered considerably by weather conditions. However, from now on, the most important sprays will have to be applied for the various pests and growers should bear in mind that spraying is an important operation not to be looked upon lightly or neglected, but an insurance that means clean fruit and therefore profit at the end of the season.

Spraying is a subject that is very frequently called to the attention of the grower, so frequently, in fact, that it would seem that all that can be said about it had been said, and yet each year sees large quantities of diseased and inferior fruit harvested in even some of the most progressive districts. Reports also show that notwithstanding a more or less rigid inspection in many fruitgrowing districts a considerable quantity of it finds its way to market. If you are inclined to neglect some phase of orchard practice do not let it be in regard to spraying. Protect yourself and your orchard by getting the sprays on at the right time.

Controlling Brown Rot

(Continued from page 4)

started add 32 lbs. of ordinary sulphur, previously screened to take out foreign matter and break up the lumps. Stir vigorously to keep the material from "burning" and adhering to the bottom of the barrel, adding water as necessary until the lime is all slaked. For peaches it is well to stop the action at the end of 15 or 20 minutes by filling the barrel with cold water, but the spray can be improved for hardier fruits by tightly covering the barrel and holding its contents hot for a longer period. Enough water should be added in any case to make it easy to screen into the spray tank for the removal of small particles that would otherwise clog nozzles and cause trouble in the valves.

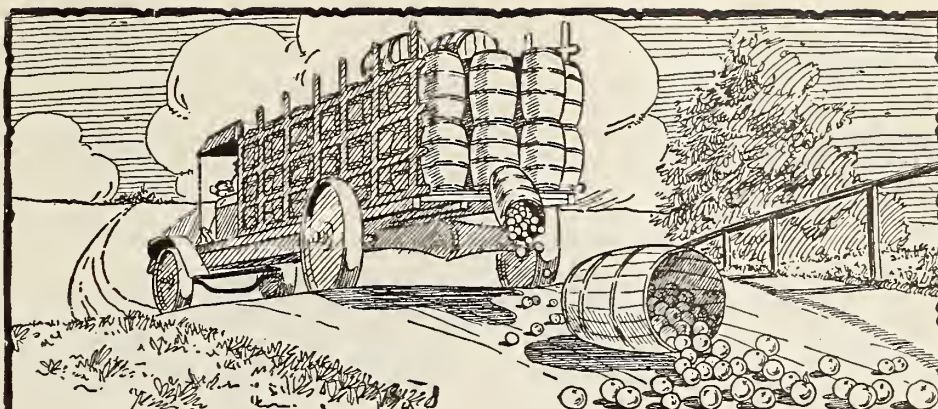
THE addition of a spreader or "sticker" is essential to best results with any spray material, more especially on smooth fruit surfaces, such as cherries and plums have. In the absence of a spreader the spray gathers in drops and "runs off like water from a duck's back." With Bordeaux and self-boiled lime-sulphur various soaps may be used. A good spreader of this type is the resin fish-oil soap which may be made at home by the following formula:

Lye, such as used for washing 1 lb.
Resin..... 5 lbs.
Fish Oil..... 1 pint
Water 5 gallons

Dissolve the resin by heating in the oil in a large kettle. After this has partially cooled, add the potash; stir slowly and watch to prevent its boiling over. Then add a part of the water and continue boiling until the mixture will dissolve in cold water. Then add the remainder of the water. Use about one quart of the soap to 50 gallons of spray.

Soaps are not suitable for use with commercial lime-sulphur and even with Bordeaux and self-boiled lime-sulphur they are frequently objected to on account of the excessive foaming in the tank. Casein is not open to this objection and forms a very efficient spreader with any spray material. It is best prepared in a stock solution, as follows:

Take one pound of the ordinary commercial granulated or powdered casein that can be obtained through druggists or wholesalers and slowly stir it into a gallon of water in which has been dissolved three ounces of caustic soda or ordinary "potash lye," and bring the mixture to a boil. The same care must be used in adding the casein as would apply if flour were used, since sticky lumps that are hard to dissolve may otherwise form. For use take one quart of the resulting solution to 200 gallons of spray.



LOST, BUT YOU DON'T KNOW IT!

In actual use on an apple orchard

NITRATE OF SODA

increased the yield by 100 bushels. If you are *not* using NITRATE OF SODA you are losing part of your crop as completely as though you lost it off the end of your truck.

Write for book of results.

DR. WM. S. MYERS
Chilean Nitrate Committee

Los Angeles, California
231 Douglas Building



Literally Millions of Dollars Go Into
Their Tiny Stomachs

Grasselli-Grade Insecticides cut them off in the "flower of their youth"—before their voracious appetites have ruined your fruit crop and income. Certain—positive—unfailing in results—when you spray with Grasselli Grade you are SURE of protection—you have put a padlock on your season's fruit income (so far as the insects and fungi are concerned).

Grasselli Grade Insecticides and Fungicides are absolutely unvarying in strength and quality—they must be so in order to earn the Grasselli label, to align with the world-wide Grasselli name and 82 years of chemical leadership.

Specify GRASSELLI GRADE when you order your spray material and INSURE your fruit crop. There's a Grasselli dealer near you.

THE GRASSELLI CHEMICAL CO., Cleveland
Founded in 1839



GRASSELLI GRADE Insecticides and Fungicides

Musical
Merchandise

Write
Us

WE SAVE YOU MONEY!

M. Martius Music House, Inc.

1009 First Avenue, Seattle, Washington
Everything Known in Music

SHEET
MUSIC

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Us

TIME TO SPRAY

First application: When the buds are showing color, but before they open.

Third application: As soon as the "husks" have fallen.

Second application: As soon as the petals have fallen.,

Fourth application: Three or four weeks before harvesting.

The Gasoline of Quality



Red Crown gasoline has well earned the right to be called "The Gasoline of Quality."

Its continuous chain of boiling points insures all of the qualities of a good motor fuel—ready starting, rapid acceleration, and maximum power.

You can get Red Crown gasoline wherever you see the "Red Crown" sign. Look for it on garages and service stations.

STANDARD OIL COMPANY
(California)



THE time to spray is a most important consideration, but no hard and fast rules can be given since much will depend upon the weather conditions and an orchardist must use his best judgment. For general insurance the above schedule is recommended and should be adhered to. In any event the first and fourth sprays should be applied. If the season is dry perhaps the second and third may be omitted, but if it is rainy they should by all means be included.

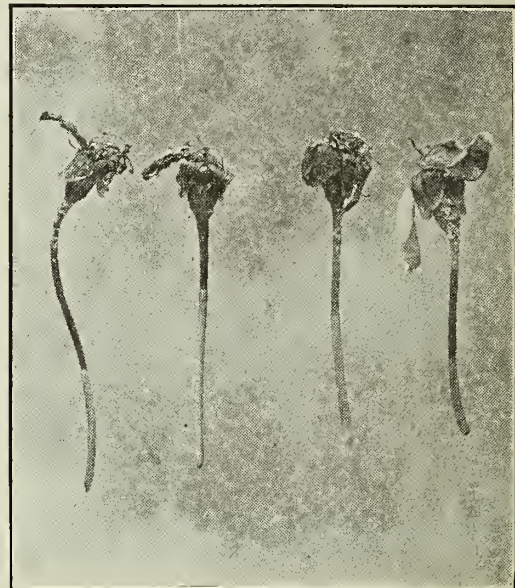


Fig. 3. Blossom blight of cherries, showing an advanced stage of the trouble where the fungus has worked back onto the stem. Note the mold growth on some of the specimens. This is the fungus which causes the disease and the spores are produced on the blossoms the same as on the fruit as shown in Fig. 1.

OTHER MYERS PRODUCTS

PUMPS FOR EVERY PURPOSE
HAY UNLOADING TOOLS
DOOR HANGERS

MYERS SPRAY PUMPS

For economy spraying use MYERS SPRAY PUMP—and by economy we mean efficiency at a minimum of cost and labor. MYERS SPRAY PUMPS and SPRAYING ACCESSORIES have long been known for the excellent results they produce. They are considered standard in every fruit growing territory, and this is not snap judgment on the part of a few—it is the result of MYERS QUALITY in design, material used, workmanship and finish which insure dependability and excellent service.

SPRAYING TIME IS HERE

If you have not already made provisions to spray, it is not too late to do so. The spraying period now continues throughout the entire spring and summer, and MYERS DEALERS everywhere are waiting to supply you with the latest and most improved types of MYERS BUCKET, BARREL and POWER SPRAY PUMPS, complete SPRAY OUTFITS and ACCESSORIES for Spraying, Whitewashing, Coldwater Painting and Disinfecting.

Our new Catalog, No SP21, is just off the press. Besides showing the entire MYERS Line of SPRAY PUMPS it devotes 20 pages to reliable "How and When to Spray" Instructions. Write for your copy today. Your dealer will supply you with MYERS SPRAY PUMPS. Ask him.

F. E. MYERS & BRO. N. 135 ORANGE ST. ASHLAND, OHIO.

For SPRAYING-PAINTING-DISINFECTING

Pacific Northwest
Distributors

Mitchell
LEWIS & STAVELAND

Portland, Oregon
Spokane, Wash.

BUY FROM THE LOCAL MITCHELL DEALER

WHEN WRITING ADVERTISERS MENTION BETTER FRUIT

Further, if rainy periods intervene between the third and fourth applications listed above it would be a timely precaution to spray whenever the danger arising therefrom becomes apparent.

The control of the syneta leaf beetle is probably of more importance in avoiding loss from brown rot than is realized by many growers. This insect not only may carry the spores, but as a result of its feeding on the fruit and blossoms infection is facilitated. It is present in large numbers every season throughout Western Oregon and Washington. The spray program should therefore include a poison for the syneta. Lead arsenate at the rate of one pound of powder or two pounds of paste to 50 gallons in the second application listed above will be found effective.

Western Apple Industry (Continued from page 5)

first-class apples comes from the Northwest and awake to the fact that we have some real competition to meet and it can only be met by adopting the most up-to-date and systematic standardized business methods. We should grow larger, better fruit and considerably more care should be exercised in grading, sizing and packing. There is not a brand of apples that I now know of but what has

and now is suffering from inferior packing house work.

The question of retail prices for our apples deserves serious consideration and careful analysis, followed by concerted action.

As a rule the jobber or wholesaler has played fair as regards profits and distribution, but the retailer, almost to a man, has not used good business judgment in his handlings of boxed apples. Usually his attitude has been to sell one box at a very big profit rather than five boxes at a reasonably fair profit and consequently the grower and consumer have suffered.

We are partly to blame for this in starting our selling season at too high prices. The public is led to believe we are charging too much and they naturally rebel and go on a buying strike. As a consequence we suffer throughout the season.

A notable example of the success of the opposite method is shown this very season with cranberries. The manager of the American Cranberry Exchange controlling a large percentage of all cranberries grown in the United States clearly saw the mistake others were making and pointed out to his grower the wisdom of the Exchange opening prices at \$8.50 per barrel instead of \$10.00, the price the growers wanted, with the result that the trade and public took hold readily, enabling price advances to be made continuously throughout the season. They remained for a long time at \$12 to \$15 per barrel and finished at \$21 and \$25 per barrel and this in the face of a big crop and notoriously dull times.

The public should be told and retold throughout the season all about our apples, perhaps not mentioning any particular brand, but featuring the best brands, varieties, sizes, uses, etc. Particular stress should be placed upon the proper season for different varieties.

We should drop local sectional jealousies and work in harmony for the good of all concerned. The press would be glad to help if given an opportunity.

We need the help and coöperation of the legitimate jobber and distributor more now than ever and they need us. We should gladly meet them more than half way, always remembering that no transaction is a complete success until all legitimate factors make a fair and equitable profit commensurate with the service performed.

The progressive dealer would welcome with great satisfaction the standardization of our grading, packing and selling methods.

It is sadly to be regretted that no more definite steps have been taken along the lines of coördinating the activities of the different highly developed apple growing sections of the Northwest.

Reap a Rich Return

PLANT DIAMOND QUALITY STOCK For Best Bearing

GRAPES —Specially selected varieties that have been proved most suitable for Oregon.

BURBANK'S THORNLESS BLACKBERRIES —Sweet and luscious; a heavy yielder and a rampant grower; the coming Oregon berry.

OREGON CHAMPION GOOSEBERRIES —Berries large, pale green, sweet, bush strong, prolific grower.

LOGANBERRIES —Partake of the flavor of both the blackberry and the raspberry. Ripen early.

STRAWBERRIES —New Oregon, Gold Dollar, Marshall, Magoon, Clark Seedling and other vigorous Western varieties.

RIVERSIDE GIANT RHUBARB —Unequalled for yield and quality, crisp, tender, free from stringiness.

CURRANTS —Many splendid varieties of this profitable, easy grown berry.

PERENNIAL AND ANNUAL BEDDING PLANTS —We have for early delivery a splendid variety of fine plants. Order now.

VEGETABLE PLANTS —We can supply all of the leading varieties in almost any quantity. Order early.

ROSES —The Famous "Diamond" Quality are large, sturdy, two-year-old, field-grown roses that will give you splendid flowers the first season.

Write for our Catalog No. 201, which gives full information of a very helpful nature.



Quality Products

Are Half Sold When Attractively Labeled.

F.C.STETTLER MFG. CO.

PORTLAND, OREGON

Offers you the art and ingenuity of years of experience in the composition of forceful and beautiful advertising art work.

LABELS—CARTONS—POSTS—ETC.



100 Per Cent Spray

Use your old Bean Rig, if you have one. Simply add our subframe and power-take-off and you'll have a 100 per cent spray rig.

You'll do your work faster and better.

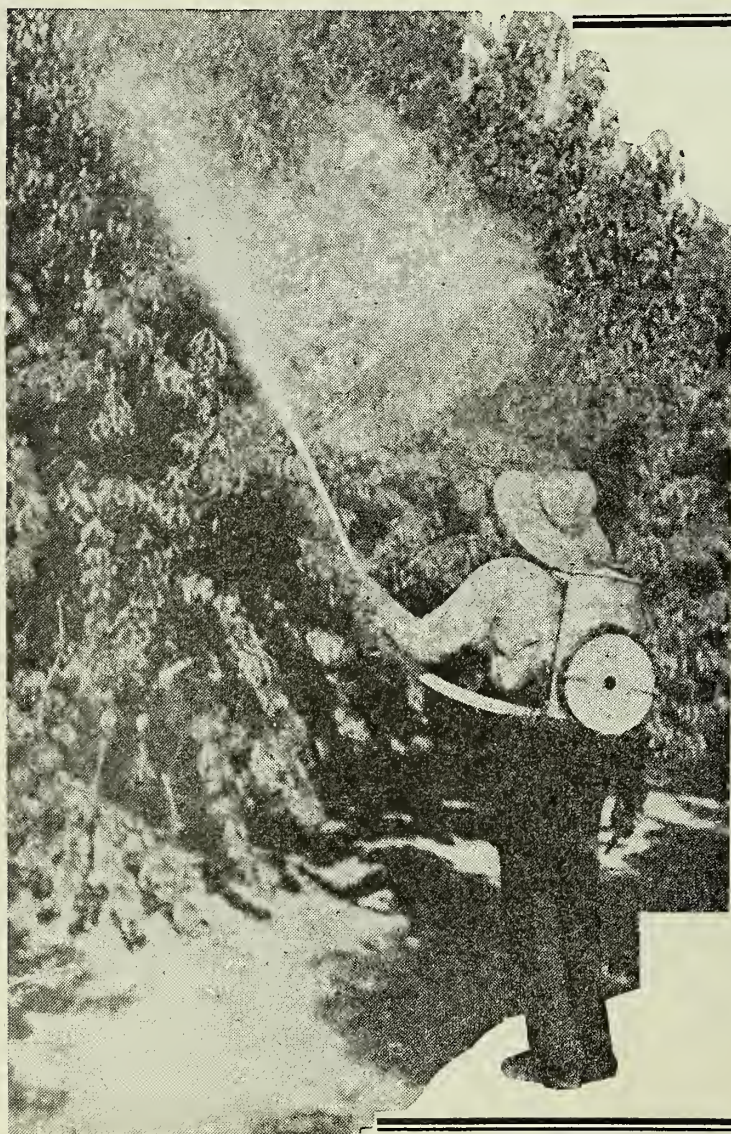
Lower your costs. Spray the GMC Way.

Seattle
Spokane

ELDRIDGE *Buick* **SALES CO.**

Yakima
Walla Walla

GMC on a Truck Is Like U. S. A. on a Bond



The American Beauty Dust Sprayer

For Orchard, Vineyard and Farm

100% Efficient

It is the *fastest, most thorough and economical* dust sprayer ever built.

It is the *standard of efficiency* in *sulphuring vines*.

It is absolutely unequalled in the *control and eradication of red spider*.

Our *method of dust application* is the most effective protection against the *codling moth*.

Our *Nicotine-Sulphur dust* is instant death to *aphis, thrips, leaf-hopper* and similar insects.

Our *method of control and concentration* of the dust *saves more than half the material*.

We Invite Correspondence

The California Sprayer Company

6001-11 Pasadena Avenue

LOS ANGELES

My thought would not be to attempt "one big union" idea, but rather the bringing together of all interests on some common ground of mutual helpfulness, where the problems confronting the industry could be freely and fairly discussed. By so doing, everyone would benefit and the producer and consumer most of all.

At the present time the various apple growing sections are in a state bordering on "armed neutrality." We should not lose sight of the fact that we are all working to the same end. What helps one, helps all and vice versa.

The biggest apple crop year for the Northwest appears to be just ahead of us. Are we suitably fortified to meet the issue? Ours are individual problems to be collectively worked out.

Northwest Fruit Notes from Here and There

WASHINGTON

THE Yakima Fruit Growers' Association announces an increase in its capital stock from \$150,000 to \$300,000.

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THE annual report for horticultural district No. 1, comprising Walla Walla, Columbia, Garfield and Asotin counties, recently completed shows that 908 cars of fruit were grown there last year.

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DURING the latter part of the apple shipping season in the Wenatchee district an unusual demand for Winesaps of the larger sizes was prevalent. As a result a high premium was offered for the big sizes.

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EARLY estimates of the peach crop in the Yakima valley are to the effect that it is below normal, owing to the fact that many trees injured in the 1919 freeze have not fully recovered and did not make sufficient wood growth in 1920 to set fruit spurs.

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CLAIMING to be the center of the strawberry growing industry in Washington, Centralia is planning an annual strawberry festival. The event, which will be held during the early part of June, will be put on under the direction of the local chamber of commerce. Between 500 and 600 acres of strawberries are now tributary to the Centralia district.

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APPLE box prices are approximately 30 per cent lower this year than at the corresponding time in 1920, according to the recent announcement of a box making company in Spokane. The wholesale price quoted is from 14 to 17 cents, while at the same time last year they were 24 cents.

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ACTION taken by the members of the Yakima Horticultural Union will result in making an assessment of two cents a box on all fruit handled by the organization this year for the purpose of starting a building fund. The financial report of the union shows assets of \$433,115. The property and plants are valued at \$286,556, and the equipment at \$30,151. Its profits and surplus at the end of the year were estimated at \$20,426.

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THE total value of the fresh fruit crop grown in the Yakima valley during the season of 1920 was \$16,065,540, according to statistics recently compiled. Of this amount the apple crop totalled \$11,792,500; pears, \$1,982,200; cherries, \$211,200; plums and prunes, \$142,800; peaches, \$275,745; strawberries, \$95,000; grapes, \$42,000; cantaloupes, \$490,000; watermelons, \$45,000. The balance of the amount was received from mixed shipments of fruits sent out by express and parcels post.

Food and Beverage

Make no mistake! Nothing can take the place of Ghirardelli's Ground Chocolate—at your table or on your dealer's shelves. Because Ghirardelli's fills a daily household need—and fulfills *every* essential of food and beverage.

Ask for Ghirardelli's Ground Chocolate at the store where you do your trading. Never sold in bulk but in cans only. In this way Ghirardelli's retains its flavor and strength—the two most important elements of good chocolate.

Say "Gear-ar-delly"

D. GHIRARDELLI CO.
Since 1852 San Francisco



GHIRARDELLI'S Ground Chocolate

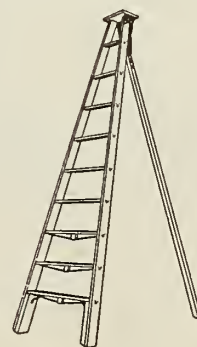
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Good standard grades. Well made. Quick shipments. Carloads or less. Get our prices.

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Catalog mailed on request.



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A reliable truthful guide for Western buyers. Ask for Book No.
ROUTledge SEED & FLORAL CO.
145 Second St., Portland, Or.



Northwest Orchard Ladders

"The Quality Line"

For Sale by
Leading Dealers Everywhere

Northwest Fence and
Wire Works
PORTLAND, OREGON

Free Spray Calendar Tells When to Spray-What to Use

The Dow Spray Chart is the result of years of experiment and research. It tells how to care for apples, cherries, plums, grapes, currants, gooseberries, peaches and other fruits—explains insect enemies and disease of potato, tomato, cabbage and vine crops. Directs the mixture of all spray materials, tells the proper time for spraying and how to apply each particular spray. You should not be without this Calendar if you grow fruit of any kind. We will gladly send it free. Quality brings the high price and quality is not possible without spraying. Write for this free chart today.

Dow Powdered

Lead Arsenate

Extremely light and fluffy—Dow Powdered Lead Arsenate possesses many advantages over the heavier and more granular varieties. It mixes so readily and remains so well in suspension that it entirely covers foliage with a milky, filmy coating. Because it reaches and covers every part of foliage and branch—because it sticks where it touches and because of its high content of arsenic, it has a deadly effect on all forms of foliage eating pests. Dow Powdered Lead Arsenate is a great economy and a great convenience. Managers of large orchards and directors of state stations have used this product for years and now purchase in carload lots.

Packed in ½, 1, 5, 10, 25, 50, 100 and 200-pound containers. Sold through our dealers or direct where we are not represented.

Ask for folder describing all Dow Spray Materials. The line includes Dow Powdered Lead Arsenate, Dow Powdered Lime-Sulphur, Dow Lime-Sulphur Solution, Dow Paste Lead Arsenate, Dow Powdered Calcium Arsenate, Dow Powdered Bordo, Dow Powdered Bordo-Arsenate. These are the finest spray materials known, for the control of vegetable and orchard pests, and are used by the world's leading orchardists and state departments in carload lots. Send coupon below for our free Spray Calendar.

THE DOW CHEMICAL CO.

MIDLAND, MICHIGAN, U. S. A.

Trade

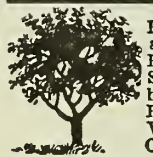


SEND FREE SPRAY CHART TO

Send
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TREES AND SHRUBS



Fruit trees budded from bearing orchards. Apple, Pear, Cherry, Peach, Plum, Prune, Apricot, Quince, Grape Vines, Shrubbery, Plants, Raspberries, Blackberries, Logans, Dewberries, Asparagus, Rhubarb, Flowering Shrubs, Roses, Vines, Hedge, Nut and Shade Trees. Carriage paid. Satisfaction guaranteed.

WASHINGTON NURSERY CO.

Toppenish, Washington.

Salesmen everywhere. More wanted.

NOW is the time to send to
Milton Nursery Co.
MILTON, OREGON

For their 1921 Catalog
Full Line of Nursery Stock
"Genuineness and Quality"

OREGON

AUTHORITIES on cherry marketing in Oregon state that they do not expect the price of cherries this year to reach the sensational figures of 1920, but that they will not drop to pre-war prices. A price of 8 cents a pound is predicted for the coming season.

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REPORTS from the various fruitgrowing districts in Oregon are to the effect that weather conditions have been extremely favorable for both orchard and bush fruits and that the unusual number of fruit buds indicate abundant crops this year. Fruiting plants and trees of all descriptions are much more forward than usual and the only possible drawback feared now is that late frosts may do considerable damage on this account.

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ACCORDING to the annual report of General Manager A. W. Stone of the Hood River Apple Growers' Association its business for the year will total \$2,476,899.12. The invested capital of the organization is \$332,345. During the past year the association handled a total of 1,052,969 packages of fruit, apples leading with 942,458 boxes. The average price for all varieties of apples for the 1920 crop is given at \$1.60 per box as compared to \$1.98 in 1919. An abundance of smaller sizes in 1920 and additional transportation charges are given as accounting for the reduction in the price during the past season.

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IN ORDER to keep China pheasants from feeding on valuable pear seed imported from Japan a nurseryman in the Hood River district is trying the experiment of coating them with coal tar. Last year this nurseryman claims to have lost \$1,000 worth of sprouted seedlings as a result of the work of these birds which are reported to be very abundant in the Hood River valley.

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ALTHOUGH it costs but 1½ cents a pound to lay Oregon prunes down in the markets of Europe by shipping by way of the Panama Canal as compared to 2¾ cents by rail through New York, it is stated that on account of the excessive heat and humidity in the canal zone it has been found hazardous to ship the large sizes through the canal, except under refrigeration.

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IN a campaign to clean up neglected orchard districts of Douglas county, County Fruit Inspector Armstrong recently destroyed 40 to 50 acres near Sutherlin and will remove others that are a menace to the rest of the fine orchard district in that county. Most of the orchards destroyed were the property of non-residents. Douglas county now has over 10,000 acres in tree fruits and is making a rapid development in the berry industry.

LOOK FOR THE LABEL



How many times have you
seen just such a request?

Much space and money is
devoted to making people
look for the label, and yet
the label itself is not given
the thought it deserves.

When the true function of
the label, the selling and
identification value it
possesses is realized, more
care will be given to the
choosing of

QUALITY LABELS

SCHMIDT LITHOGRAPH CO.
Seattle - Sacramento - Fresno - Manila
Portland - Los Angeles - Honolulu
SAN FRANCISCO

THE signing of the co-operative marketing bill by Governor Olcott now makes it possible for five persons to organize a co-operative association. One of the salient features of the law is that "no association complying with the terms of this act shall be deemed a combination in unlawful restraint of trade or an unlawful monopoly or an attempt arbitrarily to lessen competition or fix prices." The law also provides that in the event of a breach or threatened breach of contract by a member, the association shall be entitled to an injunction to prevent the further breach of contract.

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ACCORDING to a statement recently issued by F. L. Kent, in charge of the state bureau of crop estimates of the United States Department of Agriculture, the total value of the fruit crop production in Oregon in 1920 was \$15,787,803 and the total acreage, 106,831 acres. The acreage of the various fruits is given as follows: Apples, 48,565; pears, 9,583; prunes, 26,516; cherries, 4,115; loganberries, 5,427; strawberries, 3,500; raspberries and blackberries, (not including wild), 4,500; cranberries, 125; miscellaneous fruits, 1,500; nuts, 3,000. In compiling these figures the report states that the acreage is based on the returns made by the county assessors to the state tax commission with such additions as were considered warranted after correspondence with most of the assessors.

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IDAHO

PROSPECTS for a big fruit crop in Latah county, Idaho, are said by fruitgrowers in that section to be particularly bright. The winter in Idaho has been the mildest in many years and the trees generally throughout the state are in fine condition. Last year the crop was light. Latah county is one of the best strawberry districts in the Inland Empire, the acreage around Moscow and Viola being particularly large. Unless frost damage occurs one of the largest crops of fruit ever shipped out of the state is anticipated this year.

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THE Department of Bacteriology of the Idaho Agricultural Experiment Station announces that it prepares cultures for all leguminous crops. The cultures are prepared by thoroughly trained men and sent out with full directions as to their use by the farmer and orchardist. Last year the department sent out sufficient cultures to inoculate 13,211 acres and estimates of the benefits from their use are from 25 to 75 per cent in a majority of the cases.

"The Wise Men of Appletree Town"

—are the men who choose their banking connection with the same discrimination they use in pruning. The First National Bank, because of its size and comprehensiveness of its departments, is particularly equipped to offer the horticulturist the most in banking service.

Its facilities and the personal interest of its officers are at your disposal.

The
First National Bank
OF PORTLAND, OREGON

The first national bank west of the
Rocky Mountains

Your Crop Depends Upon the Spray Material You Use!

So Does the Producing Life of Your Orchard

Therefore, you cannot be too careful in the selection of your materials. ORCHARD BRAND DRY POWDERED ARSENATE OF LEAD is the outgrowth of years of scientific experiment, laboratory tests, extensive field demonstrations and long use by successful commercial fruit growers.

It is always uniform, high in concentration, adhesive, lasting and spreads evenly without collecting in splotches. Its results show in clean, perfect fruit. A thorough coating on the leaves during the late summer and fall will prevent many worm "stings" and wormy fruit. Some people may be able to afford gambling on some things, but mighty few fruit growers are willing to risk a crop failure by taking chances on spraying materials. Our appeal is to the thoughtful fruit grower who fights shy of unsupported claims, and demands to be shown.

To such fruit growers we offer Orchard Brand Dry Powdered Arsenate of Lead as a crop and tree protection. It has been proved effective. Its results are known. We shall be glad to give you the names of many successful fruit growers who are enthusiastic about its results. Suggestion: Write for the booklet. Also write for Bulletin No. 3 on Dormant Spraying of Deciduous Fruit Trees.

Other spray materials, for specific purposes, we recommend are:



Dry Powdered Arsenate of Lead
Packed in 4-lb. paper bags (48 and 96-lb. cases) and in bulk (200-lb. drums).

Standard Paste Arsenate of Lead
Atomic Sulphur
Bordeaux Mixture Paste
Dry Powdered Bordeaux Mixture
Lime Sulphur Solution
B. T. S. Dry Barium Sulphur Compound
Universal Brand Dormant Soluble Oil
Universal Brand Miscible Oil
Universal Brand Distillate Oil Emulsion
Liquid Whale Oil Soap

GENERAL CHEMICAL COMPANY

1811 L. C. SMITH BUILDING

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The Kimball Cultivator

at work in an orchard at Morrisania, Colorado.

This tool is the greatest weed eradicator and mulch producer ever made. Its blades cut three to four inches under the surface, pulverizing the soil, cutting weeds and leaving the surface smooth.

Write for catalogue and prices direct to the manufacturer.

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WE ARE

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CABLE ADDRESS: BOTANIZING, LONDON

Codes: A. B. C. 5th Edition and Modern Economy

*Treat Your Soil With***Toro Brand Agricultural
Sulphur**

It will increase your crop in some instances up to 500 per cent, prevent wire worms, smutty grain and potato scab. For Lime-Sulphur Solution use DIAMOND "S" BRAND REFINED FLOUR SULPHUR. For dry dusting use ANCHOR BRAND VELVET FLOWERS OF SULPHUR. Sold by leading dealers.

For rodent control use CARBON BISULPHIDE. Write for circulars 6, 7 and 8, prices and samples.

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CHEMICALLY TREATED, "Caro" from DessiCARE (to dry up)FRUIT MATURITY is retarded by cold or refrigeration and hastened by heat or atmospheric exposure.The soft fibrous silk-like texture of "Caro" provides just sufficient ventilation to retard the ripening process.FRUIT DECOMPOSITION starts from a bruise which opens tiny holes and permits juice to escape and BACTERIA to enter. "Caro" clings closely and dries up the escaping juice. "Caro" ingredients harden the spot, kill the BACTERIA, arrest the decomposition.United States Distributors, AMERICAN SALES AGENCIES CO., 112 Market Street, San Francisco, California

With the Poultry

CARE OF BREEDING FOWLS

POULTRY specialists connected with the United States Department of Agriculture advise that if cockerels or pullets are to be used in the breeding flocks they should be well matured. Hens, according to these specialists, are better than pullets. They lay larger eggs which produce stronger chicks. Yearling and two-year-old hens are better than the older ones. Pullets, if they are used as breeders, should be mated with a cock rather than a cockerel. If a cockerel is used he should be mated with pullets. Generally well matured cockerels will give better fertility than cocks.

When possible free range should be given to the breeding stock. It is considered better to provide it during the fall and winter before the breeding season, but if this is not possible, free range just preceding and during the breeding season will be of great value. Birds on free range will get more exercise and will therefore be in better health to give higher fertility, better hatches and stronger chicks.

Breeding flocks need careful watching to make sure that the fowls keep in good breeding condition. The birds and houses should be examined often to see that they are not infested with lice or mites. Either of these pests in any numbers will seriously and often totally destroy fertility.

In feeding the breeding flock the breeders should be fed so as to keep them in the best of condition to produce eggs. Any good laying ration is suitable for this purpose. A point that should not be overlooked is to examine the breeding male after feeding to see that his crop is full and that he is not growing thin. This should be done because some males will allow the hens to eat all the feed with the result that they get out of condition.

Provide the breeding stock with a house that is draft proof, yet well ventilated and dry. With the above precautions observed the result should be a high percentage of vigorous, strongly-bred chicks.

FEEDING YOUNG CHICKS

WATER and fine grit is the first food that should be given young chicks if they are artificially hatched. This should be given from 40 to 60 hours after they emerge from the shells. If the chicks are being brooded with hens the first grain and grit may be given at the same time. One of the best grain feeds for young chicks is chicken rolled oats which is fed in small quantities from four to five times a day for the first three or four days. At the end of this time any good brand of commercial chick feed may be gradually added to the oats, until in a week the larger part of the ration is commercial chick feed. In two weeks the rolled oats may be discontinued entirely.

The young chicks should be kept active from the start as activity is essential to their health and development. By feeding them small quantities frequently they are kept moving and not liable to become chilled. This frequent feeding in little amounts applies to their care during the day. At night they may be given all they will eat. It is not good practice to give chicks under the age of five days a mash of any kind. Grains cracked fine are the best tissue and muscle builder for young chicks. While there are other ways of starting to feed young chicks this method is one of the most successful used by expert poultrymen.

POULTRY NOTES

IF you intend to sell broilers they are more profitable at a pound and a half than when larger.

SUNFLOWERS planted along the edge of the poultry yard make shade in summer and excellent feed in the fall and winter.

IN building nests make them big enough so that the hens can get in and out without breaking the eggs. The entrance to the nests should be made in the back, so that they will be dark.

TOO much care cannot be given to cleanliness in the poultry house and yard. Clean nests are very essential in producing clean eggs. Change the nest material quite frequently and as a precaution against insects burn the discarded material.

A LITTLE salt added to the sprouted oats will be relished by poultry as a change.

IT IS well to remember that it is the early hatched pullets that produce eggs in the fall and winter when prices are high.

A TABLESPOONFUL of charcoal added every other day to the soft food of fowls will brighten up their combs and tone up their systems.

IT IS interesting to note that it is the heavy laying breeds of chickens that lay a white egg. The general purpose breeds lay brown eggs.

IF YOU have a flower garden save the poultry droppings to fertilize it. There is no better fertilizer to help in growing fine flowers.

CLOVER and alfalfa leaves thrown in the litter will be good food for the flock until they can get on the range in the spring or be given some other form of green food.

ALMOST as soon as the young chick can eat it will drink water. A bountiful supply of pure, fresh water is therefore necessary at all times. See that it is placed where the chicks can get at it easily.

TO PLUMP a dressed fowl dip it for ten seconds in water nearly or quite boiling hot and then immediately plunge it into cold water. It should then be hung in a cool place until the animal heat is entirely out. The fowl will be given a much more attractive appearance for market by this process.

THE Oregon Agricultural College experiment station calls attention to the fact that hens fed for egg production should get feed containing the food elements found in the egg. An analysis of the egg shows that it is composed of ash 12.2 per cent; water 65.7 per cent; protein 11.4 per cent; and fat 8.9 per cent. The hen cannot counterfeit her product, so must be supplied with the necessary raw materials or she cannot manufacture the finished product.

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STRAWBERRY plants, 100,000 Gold Dollar and New Oregon, \$5 per 1,000; Cuthbert and Mariboro Raspberry plants, \$2.50 per 100. Lawson Nursery, Gates, Oregon.

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FARMS FOR SALE

WANTED—To hear from owner of good ranch for sale. State cash price, full particulars. D. F. Bush, Minneapolis, Minn.

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BUFF LEGHORNS and Thompson Ringlet Barred Rocks, Cockerels, \$5.00. Circular free. Bush Farm, Rt. 3, Portland, Oregon.

MINORCAS, black, white; utility and exhibition. Eggs. Catalog free. C. E. Murray, route 1, San Diego, Cal.

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Portland, Oregon, Feb. 27, 1921.
Better Fruit, Portland, Oregon.

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ARROW CARBOLINEUM kills chicken mites in poultry houses. Preserves wood against rot and premature decay. Write for circular and prices. Carbolineum Wood Preserving Co., 222 E. Water St., Portland, Oregon.

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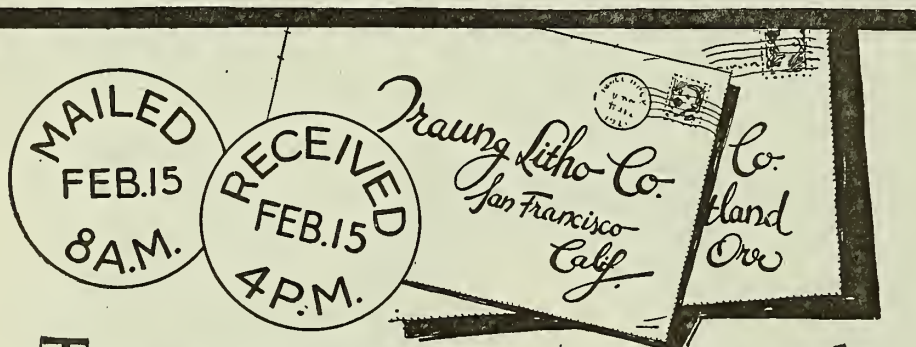
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Yakima Expects Big Crop

REPORTS from the Yakima valley are to the effect that fruit of all varieties has wintered exceedingly well and prospects for a bumper crop this year are very bright.

Barring the unforeseen, authorities who are in touch with the fruit crop prospects in this region this year estimate that the apple crop there will be close to 12,000 cars. This estimate was recently made by the state department of agriculture workers who also estimate that it will require 9,000,000 boxes to pack out the 1921 crop. If this estimate proves to be anywhere near accurate it will require 1,500 cars of lumber to make Yakima's apple boxes, while 4,500,000 pounds of paper will be necessary to provide fruit wrappers. Its expenditure for boxes alone is expected to be considerably over \$1,000,000 and the bill for fruit wraps to total over \$400,000.

Yakima's total fruit shipments during the past season approached the 10,000 car mark with a valuation of over \$12,000,000.



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